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REMARKS

Claim rejections under 35 USC 112

Claims 1-12 have been rejected under 35 USC 112, first paragraph, because allegedly the specification does not reasonably provide enablement for the membrane “discharging” a fluid droplet. The Examiner notes that the specification *does* enable the displacement of the membrane and of the ink, or the energy transfer from the electrolytic solution to the membrane, and from the membrane to the ink, either of which causes a droplet of ink to break free from the ink, such that the droplet is ejected.

Applicant surmises that the Examiner has rejected the claims on enablement grounds because the membrane does not technically “discharge” a fluid droplet, but rather *causes* a fluid droplet *to be discharged*, such as resulting from the displacement of the membrane. Therefore, Applicant has amended claim 1, from which claims 2-12 ultimately depend, so that the membrane no longer “discharge[s]” a droplet of fluid, but rather “cause[s] a droplet of the fluid to be discharged.” As such, Applicant submits that claims 1-12 now satisfy 35 USC 112, first paragraph. Applicant notes that the amendment made to claim 1 does not narrow the scope of this claim.

Claim rejections under 35 USC 103

Claims 1 and 6-12 as to Hopkins

Claims 1 and 6-12 have been rejected under 35 USC 103(a) as being unpatentable over Hopkins (5,671,905). Claim 1 is an independent claim, from which claims 6-12 ultimately depend. Applicant submits that, as amended, claim 1 is patentable over Hopkins, such that claims 6-12 are also patentable over Hopkins for at least the same reasons.

The Examiner indicates that Hopkins discloses an electrochemical actuator having a sealed quantity of electrolytic solution; a measured quantity of fluid; and, a membrane exposed to the

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electrolytic solution on one side and to the fluid on the other side. The Examiner notes that the difference between Hopkins and the claimed subject matter is the function of the device, in which claim 1 as originally presented was limited to "an electric potential applied to the electrolytic solution excit[ing] the electrolytic solution, causing the membrane to discharge a droplet of the fluid." Applicant disagrees, in that the cited recitation is an actual functional recitation of the membrane, and not a mere recitation of the use or function of the device.

That said, Applicant has amended claim 1 to better clarify its subject matter, and asserts that the amendment made thereto does not change the scope of claim 1. In particular, the functional recitation of this claim has been clarified to denote the function of the membrane. The membrane is "*adapted to cause a droplet of the fluid to be discharged in response to an electric potential applied to the electrolytic solution and that excites the electrolytic solution.*" A membrane *adapted to cause a droplet of fluid to be discharged* is clearly a limitation of the membrane, and not a statement of the function or use of the device.

Applicant notes that Hopkins has no such membrane as to which claim 1 is limited. In particular, Hopkins does not teach, disclose, or suggest a membrane that is *adapted to cause a droplet of fluid to be discharged in response to an electric potential applied to the electrolytic solution and that excites the electrolytic solution.* As such, Hopkins does not render the claimed subject matter obvious, and the claimed subject matter is patentable over Hopkins.

Claims 2-5 as to Hopkins in view of Johnson

Claims 2-5 have been rejected under 35 USC 103(a) as being unpatentable Hopkins, and further in view of Johnson (5,325,880). Applicant notes that claims 2-5 depend from independent claim 1, and therefore are patentable for at least the same reasons that claim 1 is. Furthermore, Applicant submits that claims 3 and 4 are independently patentable, irrespective of the patentability of claim 1.

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Claim 3 is a dependent claim depending from claim 2, which depends from claim 1. Claim 4 is a dependent claim depending from claim 3. Claim 2 limits the mechanism of claim 1 to a die encasing the electrolytic solution. Claim 3 limits the mechanism of claim 2 to "a separated pair of electrodes encased within the electrolytic solution by the die." As amended, claim 3's electrodes are "*adapted to* apply the electric potential to the electrolytic solution such that the electrolytic solution becomes excited." The amendment made to claim 3 does not narrow the scope of this claim.

The Examiner's reasoning as to the obviousness of claims 2-5 over Hopkins in view of Johnson only discusses Johnson's disclosure of a silicon die to encase the electrolytic solution, as to claim 2, and not claim 3's further recitation of a separated pair of electrodes. Furthermore, Johnson, and thus Hopkins in view of Johnson, does not disclose such a separated pair of electrodes. The separated pair of electrodes of claims 3 and 4 is specifically limited to that which is *adapted to* apply the electric potential to the electrolytic solution such that the electrolytic solution becomes excited. Applicant notes that this recitation is a functional recitation limiting the electrodes, and is not merely a statement of function or use of the mechanism. As such, Hopkins in view of Johnson does not render claims 3 and 4 obvious, and claims 3 and 4 are patentable over Hopkins in view of Johnson.

Claims 1 and 6-12 as to Hopkins in view of Lerat

Claims 1 and 6-12 have been rejected under 35 USC 103(a) as being unpatentable over Hopkins in view of Lerat (6,309,043). Claim 1 is an independent claim, from which claims 6-12 ultimately depend. Applicant submits that claim 1 is patentable over Hopkins in view of Lerat, such that claims 6-12 are patentable over Hopkins in view of Lerat for at least the same reasons.

The Examiner submits that the difference between claim 1 and Hopkins is the function of the device. The Examiner further cites Lerat as showing a device in which the action of a gas is

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used for controlling the movement of a fluid, such as in inkjet printing technology. On this basis, the claimed subject matter has thus been rejected over Hopkins in view of Lerat.

Applicant notes that, as has been discussed above in relation to Hopkins alone, claim 1 has been amended so that the membrane is particularly limited to being "adapted to cause a droplet of the fluid to be discharged in response to an electric potential applied to the electrolytic solution and that excites the electrolytic solution." Neither Hopkins nor Lerat disclose, teach, or suggest such a membrane as to which the claimed subject matter is limited. Therefore, the claimed subject matter is not rendered obvious over Hopkins in view of Lerat, such that the claimed subject matter is patentable over Hopkins in view of Lerat.

Claims 2-5 as to Hopkins in view of Lerat and further in view of Johnson

Claims 2-5 have been rejected under 35 USC 103(a) as being unpatentable over Hopkins in view of Lerat, and further in view of Johnson. Claims 2-5 depend from independent claim 1, and therefore are patentable for at least the same reasons that claim 1 is. Furthermore, Applicant submits that claims 3 and 4 are independently patentable, irrespective of the patentability of claim 1.

As has been noted above with respect to Hopkins in view of Johnson, claim 3 depends from claim 2, which depends from claim 1, whereas claim 4 depends from claim 4. Claim 2 limits claim 1 to also include a die encasing the electrolytic solution, whereas claim 3 limits claim 2 to also include "a separated pair of electrodes within the electrolytic solution by the die." As amended, claim 3's electrodes are "*adapted to* apply the electric potential to the electrolytic solution such that the electrolytic solution becomes excited."

As with the Examiner's reasoning as to claims 2-5 over Hopkins in view of Johnson, the Examiner's reasoning as to claims 2-5 over Hopkins in view of Lerat and further in view of Johnson only discusses Johnson's disclosure of a silicon die to encase the electrolytic solution, with respect to claim 2, and does not discuss claim 3's further electrodes recitation. However,

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Johnson, and thus Hopkins in view of Lerat and further in view of Johnson, does not disclose a separated pair of electrodes as claimed in claim 3. The electrodes of claims 3 and 4 are specifically limited to applying the electric potential to the electrolytic solution such that the electrolytic solution becomes excited. This recitation is a functional recitation limiting the electrodes, and is not merely a statement of function or use of the claimed subject matter. As such, Hopkins in view of Lerat and further in view of Johnson does not render claims 3 and 4 obvious, and claims 3 and 4 are patentable over Hopkins in view of Lerat and further in view of Johnson.

Final, general note regarding patentability of the claimed subject matter under 35 USC 103

As a final, general note regarding the patentability of the claimed subject matter under 35 USC 103, Applicant reminds the Examiner that "[i]n determining the differences between the prior art and the claims, the question under 35 USC 103 is *not* whether the differences *themselves* would have been obvious, but whether the claimed subject matter *as a whole* would have been obvious." (MPEP sec. 2141.02) (Citations omitted) The claimed subject matter of claims 1-12 is specifically limited to a mechanism that achieves discharge of fluid drops by a membrane that is adapted to cause such drops to be discharged in response to an electric potential applied to the electrolytic solution and that excites the electrolytic solution. For instance, just because the Examiner can find one reference in which there is a sealed quantity of electrolytic solution, a quantity of fluid, and a membrane exposed to the electrolytic solution on one side and to the fluid on another side, and can find another reference reciting fluid movement control within inkjet printing technology via gaseous action, does not mean that the claimed subject matter *as a whole* is obvious. The claimed subject matter uniquely achieves fluid drop ejection via the interplay between the electrolytic solution, the measured quantity of fluid, and the membrane, when an electric potential is applied to the electrolytic solution. The prior art references relied upon by the Examiner do not render this claimed subject matter obvious when the claimed subject matter is

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considered *as a whole*. Applicant thus reminds the Examiner to consider the claimed subject matter *as a whole* in assessing further action in the present patent application.

Added claims

Claims 21-30 have been added to the present patent application. Claims 21 and 26 are independent claims, from which claims 22-25 and 27-30 ultimately depend. Claim 21 recites, for example, "means for exciting the electrolytic solution, resulting in the membrane causing a droplet of the fluid to be discharged." By comparison, claim 26 recites, for example, "a flexible material comprising a first side in contact with the electrolytic solution and a second side in contact with the fluid." Applicant submits that the prior art references cited by the Examiner, either alone or in combination, do not teach, disclose, or suggest either the means recitation of claim 21 or the mechanism to apply an electric potential recitation of claim 26. As such, claims 21 and 26 are patentable over the cited prior art, and claims 22-25 and 27-30 are patentable for at least the same reasons.

Furthermore, Applicant reminds the Examiner that claims 21-30, like claims 1-12, must be considered *as a whole* in assessing their patentability under 35 USC 103. The claimed subject matter of claims 21-30 uniquely achieves fluid drop ejection via the interplay between an electrolytic solution, a quantity of fluid, a membrane, and means for exciting the electrolytic solution (in claims 21-25) or a mechanism to apply an electric potential to the electrolytic solution (in claims 26-30). The prior art references cited by the Examiner do not render these claimed subject matter obvious when the claimed subject matter is considered *as a whole*.

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Conclusion

Applicants have made a diligent effort to place the pending claims in condition for allowance, and request that they so be allowed. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Mike Dryja, Applicants' Attorney, at 425-427-5094, so that such issues may be resolved as expeditiously as possible. For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,



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Date

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